CLEANUP

IR SITE 9 - EVAPOTRANSPIRATION

LEAD ACTIVITY
Naval Air Station North Island (NAS North Island)

STATUS
Active

MISSION
To mitigate the volume of treated process groundwater generated from the steam-enhanced soil vapor extraction (SVE) and free product recovery system at Installation Restoration (IR) Site 9, NAS North Island. This process will alleviate the amount of processed groundwater discharged to the publicly owned treatment works (POTW) and will also relieve stress on the current base infrastructure.

Specifically, mitigating the volume of process groundwater that is currently discharged to the POTW will enhance the current system in the following three areas:

- Economics: reduce the fees associated with full-scale discharge and the costs associated with the potential upgrades to infrastructure for full-scale operations.
- Environmental Impacts: reduce the possibility of Notice of Violations (NOVs) due to a potential system upset.
- Public Awareness: reduce the community and public grievances for discharging process groundwater to the bay and reduce the load on the POTW.

In addition, data collected during optimization will be used to assist in preparation of the Feasibility Study (FS).

REQUIREMENT

The EPA Office of Solid Waste and Emergency Response dated 12/17/2000 serves as the regulatory framework for onsite infiltration. The memo states:

> *"Reinjection of treated groundwater to promote in-situ treatment is allowed under section 3020(b) (of the Resource Conservation and Recovery Act) as long as certain conditions are met. Specifically, the groundwater must be treated prior to reinjection; the treatment must be intended to substantially reduce hazardous constituents in the groundwater – either before or after reinjection; the cleanup must be protective of human health and the environment; and the injection must be part of a response action under CERCLA section 104 and 106 or a RCRA corrective action intended to clean up the contamination."*

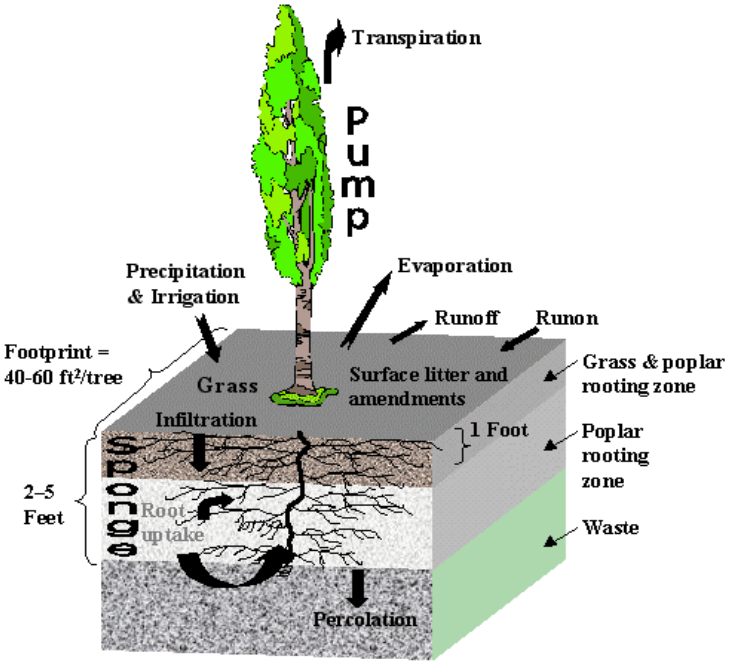
The primary discharge will still remain to the POTW with irrigation to evapotranspiration pilot program mitigating the volume of discharge to POTW while data is collected to evaluate the potential use as a full-scale alternative.

The Regional Water Quality Control Board (RWQCB) expressed concern that the treated groundwater would dissolve or mobilize existing metals in the soil and subsequently increase contamination in the near surface groundwater. Leachate tests will be performed prior to construction to assist in evaluating this option.

Federal regulators and agencies, such as the USEPA and ITRC, like high evapotranspiration irrigation as a method for reducing the amount of processed groundwater that is introduced into publicly owned treatment works.

DESCRIPTION

The current operation of the steam-enhanced soil vapor extraction (SVE) and free product recovery system at Installation Restoration (IR) Site 9, NAS North Island has led to over 14,600 pounds of liquid waste during a nine month period from September 1999 to May 2000. In order to alleviate the amount of processed groundwater discharged to the publicly owned treatment works (POTW), evapotranspiration is being investigated as a possible alternative.



Evapotranspiration is a process by which high evapotranspiration foliage (plants and trees) are selected and planted in an area that is irrigated by treated groundwater. The foliage absorbs the groundwater by natural process and is either evapotranspirated to the atmosphere or further treated by the plants prior to eventual discharge to the aquifer.

Prior to being sent to the irrigation system, the treated process water will be stored in an equalization/surge tank. The treated process water will then be batch discharged through a series of StormFilters® designed to aid in the filtration of soluble metals.

The irrigation-to-high-evapotranspiration plot will be constructed north of the Weapons Facility on the southeast side of Site 9 and will consist of approximately 2 acres. The irrigation-to-high-evapotranspiration plot will utilize either spray or drip irrigation and will

consist of a 1-inch diameter, perforated schedule 40 PVC pipe. Selected plants, known for their high evapotranspiration rates and ability to uptake heavy metals will be planted in the 2-acre irrigation-to-high-evapotranspiration plot.

Five 20-foot deep, 2-inch diameter groundwater monitoring wells will be installed within the 2-acre plot to allow for collection of groundwater samples and monitoring of groundwater elevations.

In addition, a temporary weather station will be installed to monitor air temperature, relative humidity, precipitation, and wind speed.

Irrigation and high evapotranspiration systems are currently in operation at the following sites:

- San Diego, California - Nassco Shipyards
- San Diego, California - Camp Pendleton
- Albany, Oregon - OREMET Titanium

BENEFITS

Many benefits exist for using evapotranspiration as a mechanism for reducing the amount of processed groundwater:

- Reduced construction and maintenance costs compared to conventional treatment and disposal
- Cost savings over POTW fees or infrastructure upgrades
- Reduced potential impact to sensitive receptors (San Diego Bay and POTW)
- Conveyance piping and vegetation planting easily implemented
- Plants/vegetation may be capable of additional metal adsorption through root system
- Net zero accumulation in the aquifer
- Treated water disposed on site with reduced risk of potential upset to sensitive receptors - NOV possibility is eliminated
- High community and public acceptance
- No permits required

ACCOMPLISHMENTS/CURRENT STATUS

Date	Activity
Late August 2001	Prepared letter detailing conceptual plan for construction and implementation
Late Aug/Early Sept 2001	Regulatory concurrence on conducting pilot-scale systems
October 2001	Started construction
November 2001	Completed construction and start discharge of treated water

FUTURE PLAN OF ACTION & MILESTONES

Date	Activity
Ongoing	Monitor success of evapotranspiration project

COLLABORATION/TECHNOLOGY TRANSFER

BIBLIOGRAPHY

- Thermal Enhanced Soil Vapor Extraction and LNAPL Removal Presentation for the 5th International Symposium & Exhibition on Environmental Contamination in Central & Eastern Europe (September 12-14, 2000)
- Non-Time Critical Removal Action Installation Restoration Site 9 Presentation for the Naval Air Station, North Island NAS North Island Coronado Quarterly Team Meeting (July 18, 2001)
- Draft Wastewater Discharge Letter (October 22, 2001)

UPDATED: 02/01/02